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HANGER DOOR

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Fig. 2.

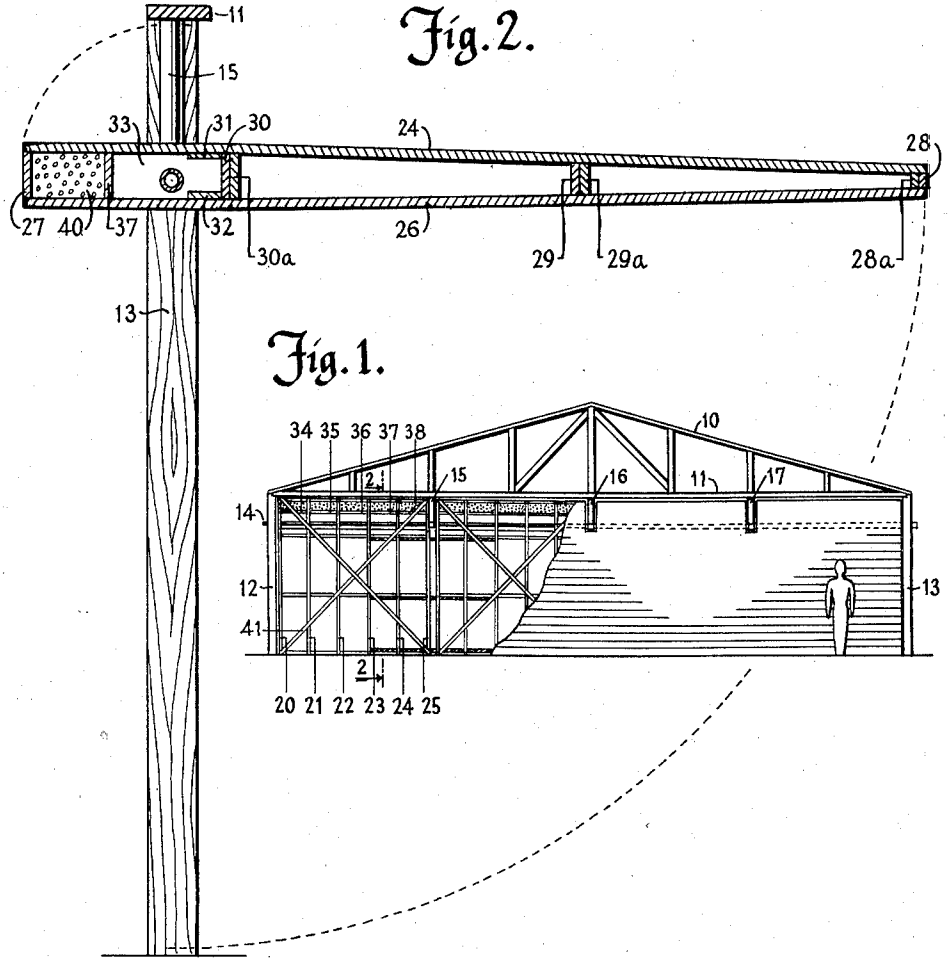

Fig. 1.

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HANGER DOOR

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This invention relates to a counter-balanced overhead type door and more particularly to an airplane hanger overhead door. While the door of this invention is primarily designed for use on airplane hangers, it is readily adapted to other uses such as on garages, warehouses, shipping terminals, gates, etc.

I am aware that various types of counter-balanced overhead doors have been proposed in the past. However, to my knowledge, none of these doors has heretofore been successfully used on an airplane hanger and, surprisingly, very few counter-balanced doors are in use on garages or other buildings requiring the use of a large door. Many airplane hangers today are equipped with sliding doors which are usually difficult to open or with an overhead roll-up type door requiring a source of power to open and close the door.

The object of this invention is to provide an easily opened, inexpensive, counter-balanced overhead type door which may, if desired, be operated manually even when the door is of relatively large size, such as on an airplane hanger.

It is characteristic of the present invention that the counter-balanced door pivots on a horizontal shaft extending through the door structure. The door framework is comprised of a series of spaced vertically disposed ribs on the front portion of the door and a series of spaced vertically disposed ribs on the back portion of the door with horizontally extending members arranged between the vertical ribs on the front and the vertical ribs on the back of the door and connected to each so as to give the door a rigid, torsion-resisting structure.

Referring now to the drawing, Figure 1 is a front elevation, partly broken away, of an airplane hanger equipped with a door made according to the present invention, the door being shown in closed position, and

Figure 2 is a section view taken along the line 2—2 of Figure 1 with the door in open position.

Figure 1 shows airplane hanger **10**, at one end of which is provided a horizontal structural beam **11** connected to and extending from the top of vertical column **12** to the top of vertical column **13** at the opposite side of hanger **10**. Beam **11** is connected to columns **12** and **13** by any suitable means.

Beam **11** and columns **12—13** define an opening through which aircraft may be moved and which is covered by the door to be described.

A metal shaft **14** is disposed below and parallel to beam **11**. Shaft **14** may be fixed to columns **12** and **13** as by means of pins (not shown) and extends completely across the end of the hanger **10**. In addition to columns **12** and **13**, shaft **14** is supported by three sleeves attached to the lower end of vertical rods **15, 16, 17**, spaced along the length of shaft **14**. Rods **15, 16, 17** are connected to beam **11** by any suitable means such as by welding.

The framework of the hanger door is comprised of four substantially identical sections connected together so as to form an integral unitary structure. The first of these sections, or the one farthest to the left in Figure 1,

comprises spaced vertical rib members **20, 21, 22, 23, 24, 25**, on the front side of the door and corresponding rib members such as the one **26** (Figure 2) on the rear side of the door. A longitudinal stringer **27** is disposed at the top of the door framework between the ribs on the front side of the door (hereinafter called "front ribs") and the ribs on the rear side of the door ("rear ribs"). Stringer **27** is securely connected to each of the ribs by any suitable means. A bottom longitudinal stringer **28** is disposed between the front ribs and the rear ribs and similarly connected to each. It will be noted that stringer **27** is more than twice as wide as stringer **28** with the result that the front ribs and the rear ribs are slightly bowed toward each other at the bottom of the framework. Intermediate longitudinal stringer **29** is disposed slightly more than one-half the distance from shaft **14** and stringer **28**. Like stringers **27** and **28**, stringer **29** extends from rib **20** to rib **25** and is securely connected to each of the front ribs and each of the rear ribs.

A second intermediate longitudinal stringer **30** is located between stringer **29** and shaft **14**. Stringer **30** differs from stringers **27, 28, 29** in that it is rigidly connected to auxiliary stringers **31, 32**, disposed normal to stringer **30** and extending throughout the length thereof. Members **30, 31**, and **32**, which in cross section define the shape of a U (as seen in Figure 2), are each securely connected to each of the front and each of the rear ribs.

Referring now particularly to Figure 2, in the upper part of the door framework, between stringer **30** and stringer **27**, a shaft receiving member **33** occupies the space between front rib **24** and rear rib **26**. Member **33**, which is provided with an aperture for shaft **14**, is securely attached to each of stringer **27**, stringer **30**, auxiliary stringers **31, 32** and ribs **24, 26** by any appropriate means. The aperture in member **33** is slightly off-center, i. e., it is slightly nearer to the rear rib **26** than to front rib **24**. A shaft receiving member similar to member **33** is provided between each of front ribs **20, 21, 22, 23** and **25** and its corresponding rear rib.

The uppermost portion of the space between each two adjacent shaft receiving members is formed into a compartment which may be used for receiving weights **40** by means of partition members **34—38** (incl.). Any suitable paneling (not shown) may be used to enclose the back and the front of the compartments in which weights may be placed. Steel straps **41** extend diagonally across the front and the back of the framework just described and are securely attached thereto to further strengthen the door.

The other three sections of the hanger door are substantially similar in structure to the one just described. If desired, the four sections may be operated independently, but it is preferred that they be connected together into a unitary structure so the entire hanger entrance can be more easily opened or closed. The four sections are connected by means of reinforcing stringers attached to the longitudinal stringers located beneath the shaft **14** and bridging adjacent sections of the hanger door framework. Thus the door section on the left side in Figure 1 is connected to the adjacent section by means of reinforcing stringer **30***a* extending about half way along and rigidly attached to the lower side of both stringer **30** and the stringer on the adjacent door section corresponding to stringer **30**. Reinforcing stringers **29***a* and **28***a* likewise bridge the two sections of the door. Similar reinforcing stringers connect the other sections of the door so as to form a unitary structure.

It is preferred that a lightweight corrugated metal covering be placed on the front of the door and secured to the front ribs by any suitable means. If desired, a similar covering may be placed on the rear ribs.

By placing appropriate weights in the compartments

along the top of the door, an almost perfectly balanced installation may be obtained so the door can be opened or closed with unbelievably little energy. It has been found that a 40 foot hanger door constructed according to the invention may be opened by one person with virtually no effort. If desired, a suitable stop may be placed on the hanger structure to arrest the movement of the door or a locking mechanism may be used to maintain the door in position.

The framework of the door of this invention may be constructed of any suitable building material. Beneficial results have been obtained with a wooden framework fastened together with screws and bolts. However, it will be obvious that a metal framework might be used. While the door described above is intended to pivot about a fixed shaft, it will be obvious that the door framework can be attached to the shaft (as by means of dowels passing from the shaft into the several shaft receiving members) so the shaft rotates with the door framework. In such an embodiment, the shaft would be adapted to rotate in bearings mounted in columns **12**, **13**. If desired, an electric powered drive may be provided to rotate the shaft for the purpose of opening or closing the door.

What is claimed is:

1. An overhead type door comprising a framework of a plurality of spaced vertical ribs on the front side of the door, a plurality of spaced vertical ribs on the rear side of the door, each of said vertical ribs on the rear side occupying the same vertical plane as one of said ribs on the front side, a plurality of spaced horizontal members disposed between said ribs on the front side and said ribs on the rear side and connected thereto, a plurality of shaft receiving members disposed between said ribs on the front side and said ribs on the rear side near the upper part of said framework and connected to said ribs, a horizontal shaft extending throughout the length of the door and excess weight means connected to said door near the upper part of said framework, each of said shaft receiving members being provided with an aperture for said shaft.

2. An overhead type door comprising a framework of a plurality of spaced vertical ribs on the front side of said door, a plurality of spaced vertical ribs on the rear side of said door, each of said vertical ribs on the rear side

occupying a vertical plane in common with one of said ribs on the front side, a plurality of spaced horizontal members disposed between said ribs on the front side and said ribs on the rear side and connected thereto, the uppermost of said horizontal members being wider than the lowermost of said horizontal members, a plurality of shaft receiving members each provided with an aperture adapted to receive a shaft disposed near the upper part of said framework, each of said shaft receiving members being connected between one of said ribs on the front side and the corresponding rib on the rear side, said shaft receiving apertures being aligned along the longitudinal axis of said door and a horizontal shaft extending throughout the length of the door and passing through said shaft receiving apertures.

3. An overhead type door assembly comprising a framework of a plurality of spaced vertical ribs on the front side of the door, a plurality of spaced vertical ribs on the rear side of the door, a plurality of spaced horizontal members disposed between said ribs on the front side and said ribs on the rear side and connected thereto, a horizontal shaft disposed near the upper part of said framework between said ribs on the front side and said ribs on the rear side and extending throughout the length of the door, means supporting said shaft at each end and a plurality of shaft receiving members each provided with an aperture adapted to receive said shaft, each of said shaft receiving members being connected between one of said ribs on the front side and the corresponding rib on the rear side and between two of said spaced horizontal members, said shaft receiving members distributing the weight of said door along said shaft while permitting said framework to pivot about said shaft.

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